

REMARKS

Upon entry of the present amendment, claims 1-15 and 28-33 will remain pending in the above-identified application and stand ready for further action on the merits. Claims 1 and 4 have been amended. Claims 16-27 have been cancelled without prejudice or disclaimer of the subject matter contained therein. New claims 28-33 have been added.

The present amendments to the claims do not introduce new matter into the application as originally filed. For example, the amendment to claim 1 finds support at claim 4. New claims 28 and 31-33 are based on the disclosure at page 15, line 32 to page 16, line 4 of the instant specification, respectively. New claims 29 and 30 are based on, for example, the disclosure at page 30, line 33 of the instant specification, respectively.

Accordingly, proper consideration of each of the pending claims is respectfully requested at present, as is entry of the present amendment.

Rejection under 35 U.S.C. §102(b) and §103(a)

At pages 2-6 of the outstanding Office Action, claims 1-27 have been rejected under 35 USC § 102(b) as being anticipated by Mitsui US '083 (US 6,037,083). Further, claims 1-27 have been rejected under 35 USC § 103(a) as being unpatentable over Isao US '776 (US 5,605,776) in view of Mitsui US '083. Applicants respectfully traverse.

Reconsideration and withdrawal of each of these rejections is respectfully requested based on the following considerations.

The Present Invention

As recited in independent claim 1, a photomask blank of the present invention has a phase shift film of a multilayer including at least four layers, and an interface between the layers is moderately graded in composition.

Similarly, a phase shift mask blank of the present invention of independent claim 10 employs a composition moderately graded from the composition of the first layer to the composition of the second layer.

Distinctions over the Cited References

Mitsui US '083 discloses a halftone phase shift mask blank having a halftone material film.

However, Mitsui US '083 merely discloses a halftone material film having a single layer, which has a unity composition. From Fig. 8 of Mitsui US'083, it is clear to one skilled in the art that the halftone material film of Mitsui US '083 has a unity composition. For example, in the figure, declination of etching rate is observed regarding a metal film, which is distinguished from the halftone material film. On the other hand, with respect to a halftone material film, declination of etching rate is not observed. Therefore, the halftone material film of Mitsui US '083 does not have a moderately graded transition between the layers of the phase shift film.

Thus, the present invention is clearly distinguished from Mitsui US '083, and Mitsui US '083 does not give one skilled in the art any motivation to arrive at the present invention.

Isao US '776 discloses a phase-shifting photomask blank comprising a phase-shifting film (see Abstract thereof). The phase-shifting film 40 has plural layer, for example, 9 layers

made of from first layer 41 to ninth layer 49 (see Fig. 9 of Isao US '776). If the each layer corresponds to the phase shift layers of the present invention, it is understood that Isao US '776 fails to disclose the moderately graded transition of the interface of layers. On the other hand, if each of the series from first layer 41 to fourth layer 44 and the series from sixth layer 46 to ninth layer 49 is an interface of fifth layer 45, the phase-shifting film is regarded as a single layer. Thus, in any event, Isao US '776 does not disclose and suggest the photomask blank of the present invention.

Regarding claim 10, the phase shift mask blank thereof has a composition based on a zirconium silicide compound on a surface side and a composition based on a molybdenum silicide compound on a substrate side. The phase shift film includes a first layer, a second adjacent layer of a different composition, and a third layer. Further, the third layer is disposed between the first and second layers and having a composition moderately graded from the composition of the first layer to the composition of the second layer.

First, neither Mitsui US '083 nor Isao US '776 discloses zirconium silicide compound. As mentioned above, Mitsui US '083 merely discloses a halftone material film having of a single layer, which has a unity composition. Isao US '776 merely discloses the phase-shifting film of a single layer or plural layers, but fails to disclose or suggest the specific interface structure of the present invention.

Both of Mitsui US '083 and Isao US '776 disclose declination of etching rate. This continuous or stepwise declination is formed by varying the composition of each layer.

However, this composition change is only applied within each layer itself.

Thus, neither Mitsui US '083 nor Isao US '776 discloses graded declination of interface between one layer and adjacent layer thereto.

Accordingly, the present invention (independent claims 1, 10 and dependent claims therefrom) is not anticipated by and not obvious over the cited references. Applicants respectfully request that the Examiner withdraw each of these rejections.

New Claims 28 and 31-33

At page 2 of the Office Action, the Examiner states that the indication of Allowability has been withdrawn because that "moderately graded composition" in the claims is not limited to "a series of at least 5 steps."

However, a feature of "a continuous transition or a stepwise transition having a series of at least 5 steps" is incorporated in new claims 28 and 31-33.

Thus, new claims 28 and 31-33 are also allowable.

CONCLUSION

Based upon the amendments and remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance clearly indicating that each of the pending claims are allowed under the provisions of Title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Gerald M. Murphy, Jr. (Reg. No. 28,977) at the telephone number below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By 

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